In the Claims:

Please amend the claims as follows:

29. (once amended) A new method of providing user selectable levels of protection against data loss in a mass storage mechanism, comprising the steps of:

providing a plurality of disk drives for storing data [thereon;] therein, the disk drives including storage segments;

organizing the storage segments of the plurality of disk drives into at least two functionally separate logical units;

B35 receiving a user input command which designates at least one of the logical units to be mirrored; and

based on said received user input command, writing data blocks into said storage segments of said plurality of disk drives so that all data blocks written to said at least one designated logical unit are mirrored by:

writing a first copy of a data block assigned to a first storage address in the designated logical unit into the first storage address in the designated logical unit, and writing a second copy of the data block assigned to the first storage address in the designated logical unit into a second storage address in the disk drives, wherein the second storage address is located in a disk drive separate from the disk drive containing the first storage address.

35. (new) An apparatus, for use in a mass storage system having a plurality of mass storage devices, where storage segments of said mass storage devices are organized into at least two logical units, for controlling writing of received information to said mass storage devices and for providing user selectable levels of protection, comprising:

a disk management controller for controlling writing of data blocks of received information, and parity blocks associated with said data blocks, to storage segments of said mass storage devices; and

said disk management controller being responsive to a user designation of at least one of said logical units for mirroring so as to write data blocks of received information which are targeted for said logical unit designated for mirroring, and at least one parity block corresponding to said data blocks, to storage segments of said mass storage devices within said logical unit designated for mirroring and writing a copy of said data blocks of received information targeted for said logical unit designated for mirroring to storage segments of said mass storage devices not within said logical unit designated for mirroring.

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36. (new) A mass storage system providing user selectable levels of protection, comprising:

a plurality of mass storage devices having storage segments organized into at least two logical units;

a disk management controller for controlling writing of data blocks of received information, and parity blocks associated with said data blocks, to storage segments of said mass storage devices;

said disk management controller being responsive to a user designation of at least one of said logical units for mirroring so as to write data blocks of received information which are targeted for said logical unit designated for mirroring, and at least one parity block corresponding to said data blocks, to storage segments of said mass storage devices within said logical unit designated for mirroring and writing a copy of said data blocks of received information targeted for said logical unit designated for mirroring to storage segments of said mass storage devices not within said logical unit designated for mirroring.

37. (new) A mass storage system providing user selectable levels of protection, comprising:

a plurality of mass storage devices having storage segments organized into at least two logical units;

a disk management controller for controlling writing of data blocks of received information, and parity blocks associated with said data blocks, to storage segments of said mass storage devices;

said disk management controller being responsive to a user designation of at least one of said logical units for parity inhibition, so as to write data blocks of received information, which are targeted for said logical unit designated for parity inhibition, to storage segments of said mass storage devices within said logical unit designated for parity inhibition but not to write a parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for parity inhibition;

said disk management controller also being responsive to a user designation of at least one of said logical units for parity protection so as to write data blocks of received information, which are targeted for said logical unit designated for parity protection, to storage segments of said mass storage devices within said logical unit designated for parity protection and to write at least one parity block corresponding to said data blocks to storage segments of said mass storage devices; and

said disk management controller also being responsive to a user designation of at least one of said logical units for off-line parity generation so as to read data blocks which have been written to storage segments of said logical unit designated for off-line parity generation without a corresponding parity block, generate at least one parity block corresponding to said data blocks written without a corresponding parity block, and write the thus generated parity block to storage segments of said mass storage devices.

38. (new) An apparatus in accordance with claim 37, wherein

said parity blocks are written to a plurality of said mass storage devices.

39. (new) An apparatus in accordance with claim 37, wherein:

said disk management controller is responsive to a user designation of a logical unit for mirroring so as to write data blocks of received information, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices within said logical unit designated for mirroring, and write a copy of said data blocks, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices not within said logical unit designated for mirroring; and

said disk management controller is responsive to a user designation of a logical unit for mirroring and parity protection so as to:

write data blocks of received information, which are targeted for said logical unit designated for mirroring and parity protection, to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection and write at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection, and

write a copy of said data blocks, which are targeted for said logical unit designated for mirroring and parity protection, to storage segments of said mass storage devices not within said logical unit designated for mirroring and parity protection.

40. (new) An apparatus, for use in a mass storage system having a plurality of mass storage devices, where storage segments of said mass storage devices are organized into at least two logical units, for controlling writing of received information to said mass storage devices and for providing user selectable levels of protection, comprising:

writing means for controlling writing of data blocks of received information, and parity blocks associated with said data blocks, to storage segments of said mass storage devices;

said writing means being responsive to a user selection of at least one of said logical units for parity inhibition so as to write data blocks of received information, which are targeted for said at least one logical unit selected for parity inhibition, to storage segments of said mass storage devices within said at least one logical unit

selected for parity inhibition but not to write a parity block corresponding to said data blocks to storage segments of said mass storage devices within said at least one logical unit selected for parity inhibition;

said writing means also being responsive to a user selection of at least one of said logical units for parity protection so as to write data blocks of received information, which are targeted for said at least one logical unit selected for parity protection, to storage segments of said mass storage devices within said at least one logical unit selected for parity protection and to write at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said at least one logical unit selected for parity protection; and

off-line parity means, responsive to a user selection of at least one of said logical units for off-line parity generation, for reading data blocks which have been written to storage segments of said at least one logical unit selected for off-line parity generation without a corresponding parity block, and for generating at least one parity block corresponding to said data blocks written without a corresponding parity block, and for writing the thus generated parity block to at least one of said storage segments.

41. (new) An apparatus in accordance with claim 40, further comprising:

mirroring means, responsive to a user selection of a logical unit for mirroring, for writing data blocks of received information, which are targeted for said logical unit selected for mirroring, to storage segments of said mass storage devices within said logical unit selected for mirroring, and for writing a copy of said data blocks, which are targeted for said logical unit selected for mirroring, to storage segments of said mass storage devices not within said logical unit selected for mirroring.

42. (new) An apparatus, for use in a mass storage system having a plurality of mass storage devices, for controlling writing of information to said mass storage devices and for providing user selectable levels of protection against data loss, comprising:

a mechanism adapted to receive an inputted command from a user designating one or more portions of storage segments of said mass storage devices for selective operation thereupon;

a mechanism, responsive to a received user designation, adapted to write only data blocks to a portion of the storage segments when said received designation designates the portion for parity inhibition;

a mechanism, responsive to a received user designation, adapted to write data blocks and corresponding parity blocks to a portion of the storage segments when said received designation designates the portion for parity protection;

a mechanism, responsive to a received user designation, adapted to read data blocks which have been written without associated parity blocks in a portion of the storage segments, to generate parity blocks associated therewith and to write the thus generated parity blocks to the portion of the storage segments when the received designation designates the portion for off-line parity generation; and

a mechanism, responsive to a received user designation, adapted to write data blocks to a first portion of the storage segments and to write a copy of said data blocks to storage segments of said mass storage devices when said received designation designates the first portion for mirroring protection.

43. (new) A method, for use in a mass storage system having a plurality of mass storage devices, where storage segments of said mass storage devices are organized into a plurality of logical units, for writing received information to said mass storage devices and for providing user selectable levels of protection, said method comprising the steps of:

receiving a user designation of at least one of said logical units for selective operation thereupon;

in response to a designation of a logical unit for parity inhibition, writing data blocks of received information, which are targeted for said logical unit designated for parity inhibition, to storage segments of said mass storage devices within said logical unit designated for parity inhibition but not writing a parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for parity inhibition;

in response to a designation of a logical unit for parity protection, writing data blocks of received information, which are targeted for said logical unit designated for

parity protection, to storage segments of said mass storage devices within said logical unit designated for parity protection and writing at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for parity protection; and

in response to a designation of a logical unit for off-line parity generation:

reading data blocks which have been written to storage segments of said logical unit designated for off-line parity generation without a corresponding parity block,

generating at least one parity block corresponding to said data blocks written without a corresponding parity block, and

writing the thus generated parity block to storage segments of said logical unit designated for off-line parity generation.

44. (new) A method in accordance with claim 43, further comprising the steps of:

in response to a designation of a logical unit for mirroring, writing data blocks of received information, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices within said logical unit designated for mirroring, and writing a copy of said data blocks, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices not within said logical unit designated for mirroring.

45. (new) A method in accordance with claim 43, further comprising the steps of:

in response to a designation of a logical unit for mirroring and parity protection:

writing data blocks of received information, which are targeted for said logical unit designated for mirroring and parity protection, to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection and writing at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection, and

writing a copy of said data blocks, which are targeted for said designated logical unit for mirroring and parity protection, to storage segments of said mass storage devices not within said logical unit designated for mirroring and parity protection.

46. (new) A method of providing user selectable levels of protection to information stored to a mass storage system, comprising:

organizing storage segments of a plurality of mass storage devices into at least two logical units;

writing data blocks of received information, and parity blocks associated with said data blocks, to the storage segments of said mass storage devices; and

in response to a user designation of at least one of said logical units for mirroring:

writing data blocks of received information which are targeted for said at least one of said logical units designated for mirroring, and at least one parity block corresponding to said data blocks, to storage segments of said mass storage devices within said at least one of said logical units designated for mirroring, and

writing a copy of said data blocks of received information targeted for said logical unit designated for mirroring to storage segments of said mass storage devices not within said at least one of said logical units designated for mirroring.

47. (new) The method of claim 46 further comprising writing data blocks to at least one of said logical units without generating or writing parity blocks associated with the data blocks.

48. (new) The method of claim 46 further comprising writing data blocks to at least one of said logical units without writing a copy of the data blocks.

49. (new) The method of claim 46 wherein said step of writing data blocks of received information and a parity block associated with said data blocks comprises writing said data blocks and said parity block in a stripe that extends across a plurality of said mass storage devices.

50. (new) A mass storage system providing user selectable levels of protection, comprising:

means for storing data, said means for storing data including storage segments;

means for organizing said means for storing data into at least two logical units;

means for controlling writing of data blocks of received information, and parity blocks associated with said data blocks, to said storage segments of said mass storage devices; and

means for writing data blocks of received information which are targeted for one of said logical units, and at least one parity block corresponding to said data blocks, to storage segments of said mass storage devices within said logical unit and writing a copy of said data blocks of received information targeted for said logical unit to storage segments of said mass storage devices not within said logical unit, in response to a user selected mirror protection designation of said logical unit.

51. (new) The mass storage system of claim 50 further comprising;

means for interfacing said mass storage system to a host computer.

52. (new) The mass storage system of claim 50 further comprising:

means for receiving said user selectable level of protection.

53. (new) The mass storage system of claim 50 further comprising near line archival storage means.

54. (new) The mass storage system of claim 50 further comprising means for translating a logical address of a logical unit to a physical address of the logical unit.

55. (new) The mass storage system of claim 50 further comprising processing means for controlling the writing of data blocks to said means for storing data.

56. (new) A method of providing user selectable levels of protection in a mass storage system including a plurality of mass storage devices, storage segments of said mass storage devices being organized into at least two logical units, the method comprising:

receiving a user selected protection level for a logical unit of a mass storage system;

writing data blocks of received information, which are targeted for a first logical unit, to storage segments of said mass storage devices within the first logical unit without writing parity blocks corresponding to said data blocks within said first logical unit, when the user selects parity inhibition for said first logical unit;

writing data blocks of received information, which are targeted for said first logical unit, to storage segments of said mass storage devices within said first logical unit and writing at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said first logical unit, when said user selected protection level for said first logical unit requires parity protection; and

reading data blocks which have been written to storage segments of said first logical unit for off-line parity generation without a corresponding parity block, generating at least one parity block corresponding to said data blocks written without a corresponding parity block, and writing the thus generated parity block to storage segments of said first logical unit, when said user selected protection level for said first logical unit requires off-line parity generation.

57. (new) The method of claim 56 further comprising:

writing a mirror copy of said data blocks of received information which are targeted to said first logical unit, to a second logical unit, said second logical unit having at least one storage segment corresponding to each storage segment in said first logical unit, wherein each at least one corresponding storage segment of said second logical unit is on a separate mass storage device than said storage segment of said first logical unit.

58. (new) The method of claim 57 wherein said step of writing a mirror copy is performed in response to said receiving of said user selected protection level.

59. (new) The method of claim 57 wherein said step of writing a mirror copy is performed in response to receiving a second user selected protection level.

60. (new) A method for providing user selectable protection levels for data stored in a mass storage system having a plurality of mass storage devices, comprising:

(a) organizing a plurality of mass storage devices into logical units, each logical unit having associated therewith a user selectable level of protection;

(b) receiving an inputted command designating a logical unit for selective operation thereupon;

(c) in response to a first received user designation of protection level, writing only data blocks to the logical unit;

(d) in response to a second received user designation of protection level, writing data blocks and corresponding parity blocks to the logical unit;

(e) in response to a third received user designation of protection level, reading data blocks which have been written without associated parity blocks in the logical unit, generating parity blocks associated therewith and writing the thus generated parity blocks to the logical unit;

(f) in response to a fourth received user designation of protection level, writing data blocks to the logical unit and writing a copy of said data blocks to a second logical unit; and

wherein step (f) is performed concurrently or sequentially in time with any one of steps (c) through (e).

61. (new) The method of claim 60 wherein a user selects a protection level by inputting commands to a host computer connected to the mass storage system.

62. (new) The method of claim 60 further comprising writing said data blocks to a cache memory prior to said step of writing only data blocks to the logical unit.

63. (new) The method of claim 60 further comprising the step of storing in a cache memory a copy of recently accessed data blocks.

64. (new) A computer system comprising:

a plurality of mass storage devices, each of said mass storage devices having a plurality of storage segments;

where said storage segments of said mass storage devices are organized into at least two logical units;

a processor coupled to the mass storage devices, the processor configured to receive user selected protection levels for one or more logical units;

a program instruction memory coupled to said processor and storing program instructions, including program instructions to:

designate a first logical unit as having parity inhibition and to store data blocks of received information in storage segments of the designated logical unit; write data blocks of received information, which are targeted for said logical unit designated for parity inhibition, to storage segments of said mass storage devices within said logical unit designated for parity inhibition, but not to write a parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for parity inhibition;

designate said first or another logical unit as having parity protection and to write data blocks of received information, which are targeted for said first or another logical unit, to storage segments of said mass storage devices within said first or another logical unit and write at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said first or another logical unit; and

designate said first or another logical unit as having off-line parity generation and to:

read data blocks which have been written to storage segments of said designated logical unit for off-line parity generation without a corresponding parity block,

generate at least one parity block corresponding to said data blocks written without a corresponding parity block, and

write the thus generated parity block to storage segments of said mass storage devices.

65. (new) The computer system of claim 64 comprising a second processor and wherein a portion of the program instructions run on said first processor and a portion of said program instructions run on said second processor.

66. (new) The computer system of claim 65 wherein a portion of said program instructions is run on a host computer.

67. (new) The computer system of claim 66 wherein said host computer includes initial configuration and formatting information for said plurality of mass storage devices.

68. (new) The computer system of claim 64 wherein said program instructions further include instructions to:

designate a logical unit for mirroring and to write data blocks of received information, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices within said logical unit designated for mirroring, and to write a copy of said data blocks, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices not within said logical unit designated for mirroring.

69. (new) The computer system of claim 64 wherein said program instructions further include instructions to:

designate a logical unit for mirroring and parity protection and to write data blocks of received information, which are targeted for said logical unit designated for mirroring and parity protection, to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection and to write at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection; and

write a copy of said data blocks, which are targeted for said logical unit designated for mirroring and parity protection, to storage segments of said mass storage devices not within said logical unit designated for mirroring and parity protection.

70. (new) The computer system of claim 64 further comprising a near line archival storage device.

71. (new) The computer system of claim 64 further comprising a cache memory and wherein said processor stores at least one of said data blocks in said cache memory prior to storing said at least one data block to said storage segments.

72. (new) The computer system of claim 64 wherein said mass storage devices comprise disk drives.

73. (new) A storage system comprising:

a processor;

a cache memory coupled to the processor, the cache memory including between 16 Mbytes and 256 Mbytes of memory;

a plurality of disk drives coupled to receive instructions from the processor; and

at least one hot spare disk drive, the hot spare disk drive being available to replace one of the plurality of disk drives;

wherein the disk drives are partitioned into a plurality of logical units;

wherein data to be stored in the storage system is striped across more than one of the plurality of disk drives;

wherein each logical unit is adapted to be configured with an independently selectable level of data protection;

wherein each logical unit is also adapted to be configured with an independently selectable data storage size;

wherein a first one of the levels of data protection includes the addition of parity information, wherein both data and parity information are distributed across a plurality of disk drives;

wherein a second one of the levels of data protection includes mirroring;

wherein a third one of the levels of data protection includes data written without parity information and without mirroring; and

wherein data that is written to the disk drives without parity information can be modified to add parity information.

74. (new) The system of claim 73 further comprising an interface to be coupled to a host system.

75. (new) The system of claim 74 wherein the interface comprises a SCSI interface.

76. (new) The system of claim 73 further comprising at least one bus coupled between the processor and the disk drives.

77. (new) The system of claim 76 wherein the at least one bus comprises an XBUS.

78. (new) The system of claim 73 further comprising a plurality of disk controllers, each of the disk controllers being coupled to an associated one of the disk drives.

79. (new) The system of claim 73 wherein the second one of the levels of data protection comprises mirroring by writing data across a plurality of said disk drives and writing a copy of the data across the same plurality of disk drives, wherein the data and the copy of the data are written into two locations in the plurality of disk drives wherein the two locations are skewed with respect to one another such that each location resides on a different one of the disk drives.

80. (new) The system of claim 79 wherein the second one of the levels of data protection further comprises the addition of parity information.

81. (new) The system of claim 73 wherein a fourth one of the levels of data protection includes both mirroring and parity.

82. (new) The system of claim 73 wherein the third one of the levels of data protection further includes subsequently generating parity information.

83. (new) The system of claim 73 where data to be stored in the memory system is striped across all of the drives in the plurality of disk drives.

84. (new) A data storage system comprising:

a plurality of disk drives operating as an array;

a microprocessor coupled to the disk drives; and

program memory storing routines for managing data on the plurality of disk drives, the routines including routines for:

defining logical storage units,

responding to a user selected data protection level and for storing data in a first logical unit by striping the data across the plurality of disk drives in response to the user selecting a first level of data protection,

storing in a second logical unit a mirror copy of the data stored in the first logical unit in response to the user selecting a second level of data protection, and

generating parity information from the stored data and storing the parity data to a logical storage unit in response to the user selecting a third level of data protection.

85. (new) The data storage system of claim 84 wherein said plurality of disk drives are of different sizes and configuration.

86. (new) The data storage system of claim 84 further comprising a plurality of microprocessors coupled to the disk drives.

87. (new) The data storage system of claim 84 wherein at least some of said routines are stored on a host computer.

88. (new) A data storage configuration comprising:

a plurality of disk drives, each disk drive having a processor associated therewith and a plurality of storage segments;

a first logical unit including a plurality of said storage segments, the plurality of storage segments logically organized as stripes across the plurality of disk drives;

a second logical unit including a second plurality of storage segments, the second plurality of data segments logically organized as stripes across the plurality of disk drives;

the first logical unit containing a first copy of data stored as data blocks in the storage segments, and parity information generated from the data and stored as parity blocks in the data segments; and

the second logical unit containing a second copy of the data when the first logical unit is selected by a user for mirroring and containing other data when the first logical unit is not selected by the user for mirroring.

89. (new) The data storage configuration of claim 88 wherein said stripes are of a user selectable size.

90. (new) The data storage configuration of claim 88 further comprising a hot replacement disk drive that can be substituted for one of the plurality of disk drives.

91. (new) The data storage configuration of claim 88 wherein the plurality of disk drives are interconnected by a single bus.

92. (new) The data storage configuration of claim 88 further comprising a host computer interface.

93. (new) The data storage configuration of claim 88 further comprising a cache memory coupled to the plurality of disk drives having stored therein a copy of at least one of said data blocks.

94. (new) A mass storage organization comprising:

a storage pool including a plurality of storage devices, each storage device being partitioned into storage segments;

the storage segments being organized into logical units;

each said logical unit having a logical identification associated with it;

each logical unit having associated with it a user selectable data protection level;

wherein, for a first logical unit having a first user selectable data protection level, a mirror copy of data stored in the first logical unit is stored in a second logical unit; and

wherein for a third logical unit having a second user selectable data protection level, parity data is generated from data stored in the third logical unit and stored in the storage pool.

95. (new) The mass storage organization of claim 94 wherein the plurality of storage devices share a common bus.

96. (new) The mass storage organization of claim 94 wherein the plurality of storage devices are of varying sizes.

97. (new) The mass storage organization of claim 94 wherein the user selectable protection level includes mirroring, or parity generation, or a combination thereof.

98. (new) The mass storage organization of claim 94 wherein the first logical unit and the second logical unit have different storage capacities.

99. (new) The mass storage organization of claim 94 wherein the mirror copy of data stored in the second logical unit is stored in data segments corresponding to data segments of the first logical unit, and

wherein each data segment of the second logical unit is stored on a separate storage device from the corresponding data segment of the first storage device.

100. (new) A data storage and management system comprising:

a host computer interface;

at least one microprocessor coupled to the host computer interface;

memory coupled to said at least one microprocessor;

an array of storage devices coupled to the at least one microprocessor, the array of storage devices configured as a plurality of logical units, each logical unit extending across a plurality of the storage devices of the array; and

a computer program stored in said memory, the computer program including routines for implementing user selected levels of data protection;

at least one of said routines including:

(i) instructions for storing to said array of storage devices a mirror copy of data stored in said array of storage devices, and

(ii) instructions for generating parity data for data previously stored without parity data in said array of storage devices and storing said generated parity data to said array of storage devices.

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101. (new) The data storage and management system of claim 100 further comprising a storage device fault indicator display coupled to at least one of said storage devices, and

a hot replacement storage device coupled to said array of storage devices, wherein the computer program includes a routine for substituting the hot replacement storage device in place of a failed storage device.

102. (new) The data storage and management system of claim 100 wherein each of said storage devices is partitioned into data blocks having a user selectable block size.

103. (new) The data storage and management system of claim 100 further comprising a storage device processor coupled between said microprocessor and each one of said storage devices.

104. (new) The data storage and management system of claim 100 wherein at least one logical unit extends across every storage device in the array of storage devices.

105. (new) A method for managing data in a computer system comprising:

configuring a first logical unit, the first logical unit being distributed across a plurality of storage devices of an array of storage devices;

assigning a first logical designation to the first logical unit;

configuring a second logical unit, the second logical unit being distributed across the plurality of storage devices;

assigning a second logical designation to the second logical unit;

receiving a user selected first protection scheme for the first logical unit and applying data protection to data stored in the first logical unit in response to the user selected first protection scheme; and

receiving a user selected second protection scheme to the second logical unit and applying data protection to data stored in the second logical unit in response to the user selected second protection scheme.

106. (new) The method of claim 105 further comprising:

storing in a third logical unit a mirror copy of data in the first logical unit when the user selected first protection scheme is mirroring.

107. (new) The method of claim 105 further comprising:

generating and storing parity data for the data to be written to the second logical unit when the user selected second protection scheme is parity generation.

108. (new) The method of claim 105 further comprising:

storing data to a cache memory prior to storing said data in the first logical unit.

109. (new) A method for changing the level of data protection for data stored on a mass data storage system comprising:

partitioning an array of storage devices into logical units;

associating with at least one of said logical units a user selected protection level;

in response to a first user selected protection level for said at least one logical unit, generating parity data for data targeted to be stored to said at least one logical unit, and writing the parity data, interleaved with the data, by striping the data and parity data across said at least one logical unit;

in response to a second user selected protection level for said at least one logical unit, storing said data targeted to be stored to said at least one logical unit, subsequently generating parity data for said data stored to said at least one logical unit, and storing said subsequently generated parity data to said array of storage devices; and

in response to a third user selected protection level for said at least logical unit, storing a first copy of data targeted to be stored in said at least one logical unit in said logical unit and storing a second copy of said data targeted to be stored in said at least one logical unit in a second one of said logical units.

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110. (new) The method of claim 109 wherein the first and second user selected protection levels are entered from a remote computer.

111. (new) The method of claim 109 wherein the logical unit and the second logical unit are partitioned into data segments and wherein the first copy of data is stored in data segments and the second copy of said data is stored in mirror data segments and wherein each of said data segments has a corresponding mirror data segment that resides on a different storage device than said data segment resides on.

112. (new) A method of organizing data in an array of storage devices comprising:

pooling the storage space of an array of storage devices into a single virtual storage space;

organizing the pooled storage space into logical units, each logical unit being striped across the pooled storage devices, each logical unit having user selectable configuration characteristics associated with it;

writing data to a first one of said logical units, wherein the data is striped across the pooled storage devices when a first user selectable configuration characteristic is associated with the first logical unit; and

maintaining in a second one of said logical units a mirror copy of the data stored to the first logical unit when a second user selectable configuration characteristic is associated with the first logical unit; and

generating parity data from the data written to the first logical unit and storing the parity data to the first logical unit, when a third user selectable configuration characteristic is associated with the first logical unit.

113. (new) The method of claim 112 further comprising:

detecting the presence of a failed storage device in the array of storage devices; and

substituting a replacement storage device for the failed storage device upon such detection.

114. (new) The method of claim 112 further comprising:

selecting a stripe size.

115. (new) The method of claim 112 further comprising:

receiving a user instruction to change the user selectable configuration characteristic for the first logical unit.

116. (new) A method of data storage having user selectable levels of data protection, comprising:

logically pooling the storage space of an array of storage devices into a single virtual storage space;

logically dividing the virtual storage space into two or more logical units;

in response to a request to store data to a first logical unit, striping the data across a plurality of storage devices in the array;

determining the level of data protection selected by the user; and

if a first level of data protection is selected, striping a mirror copy of the data across a plurality of storage devices in the array, wherein the data is stored in storage segments of the storage devices and the mirror copy of the data is stored in corresponding

storage segments of the storage devices and no data segment and corresponding data segment are on the same storage device; and

if a second level of data protection is selected, generating parity data from the data to be stored to the first logical unit and storing the parity data to the storage devices.

117. (new) The method of claim 116 further wherein the first level of data protection is selected and further comprising:

receiving an updated level of data protection; and

generating and storing parity data from the data stored to the first logical unit in response to the updated level of data protection.

118. (new) A method of changing the protection level of data stored to a mass storage system comprising:

apportioning each storage device of a plurality of storage devices into data storage segments;

storing a first set of data to a first logical unit, the first logical unit being striped across the storage devices;

storing a mirror copy of the first set of data to a second logical unit, the second logical unit being striped across the storage devices;

upon an indication by a user to change the protection level, generating parity data from the first set of data; and

storing the parity data.

119. (new) The method of claim 118 wherein the parity data for the first set of data is stored to data storage segments of at least two different storage devices.

120. (new) The method of claim 118 wherein the storage segments have a user selectable size.

121. (new) The method of claim 118 further comprising:

substituting a hot replacement drive for one of the plurality of storage devices upon detection of a failed storage device in the plurality.

122. (new) The method of claim 118 further comprising storing a mirror copy of the parity data.

123. (new) An apparatus configured to perform the steps of claim 118.

124. (new) A program storage medium containing program instructions for performing the method of claim 118.

125. (new) A method of data storage comprising:

configuring a plurality of disk drives, each of the disk drives having storage space;

defining a first logical unit, the first logical unit including a first portion of the storage space of each of the disk drives;

writing data to the first logical unit using a first level of protection, wherein the data is striped across each of the disk drives of the storage system;

receiving a user selectable indication of a desired second level of protection;

reading the data from the first logical unit and generating therefrom parity data in response to receiving the user selectable indication; and

storing the parity data to the plurality of disk drives.

126. (new) The method of claim 125 wherein the parity data is written to the first logical unit.

127. (new) The method of claim 125 further comprising:

writing a mirror copy of the data to a second logical unit in response to receiving a user selectable indication of a desired third level of protection.

128. (new) The method of claim 127 further comprising:

writing a mirror copy of the parity data to the second logical unit.

129. (new) A computer-readable storage medium comprising computer program code stored therein, the computer program code having instructions for performing the steps of claim 125.

130. (new) A data storage system comprising:

a pool of storage devices, each storage device being partitioned into segments;

the pool being partitioned into a plurality of logical units, each logical unit having associated with it a user selectable level of data protection;

a host computer interface;

a processing unit coupled to the host computer interface and to the pool of storage devices, including:

a microprocessor, and

memory coupled to the microprocessor, storing routines for execution by said microprocessor including routines to:

logically partition a body of data into data blocks,

store each data block in a segment of a storage device,

generate parity data for the body of data,

logically partition the parity data into parity blocks,

for each data block, store a first copy of the data block on a first storage device and a second copy of the data block on a second storage device,

inhibit generation of parity data for a user selected logical unit, and

generate parity data for data previously stored with parity data generation inhibited and to store the parity data.

131. (new) The data storage system of claim 130 wherein the host computer interface is coupled to a single host computer.

132. (new) The data storage system of claim 130 wherein a user selects the size of the storage device segments.

133. (new) A fault-tolerant method of storing data comprising:

organizing a mass storage system into a plurality of logical units;

in response to a first user selection, storing data to at least one of said logical units using a first fault-tolerance scheme;

in response to a second user selection, storing data to at least one second of said logical units using a second fault-tolerance scheme; and

in response to a third user selection, re-configuring said first fault-tolerance scheme to a third fault-tolerance scheme.

134. (new) The method of claim 133 wherein the first fault-tolerance scheme comprises inhibiting parity generation.

135. (new) The method of claim 133 wherein the second fault-tolerance scheme comprises storing a mirror copy of data stored to said at least one second logical unit.

136. (new) The method of claim 133 wherein the third fault-tolerance scheme comprises parity generation and storage.

137. (new) The method of claim 133 wherein:

said data stored to said at least one second of said logical units is stored in data segments across a plurality of storage devices;

said mirror copy comprises a mirror segment of each of said data segments and said mirror segments are stored across a plurality of storage devices; and wherein

each mirror segment is stored on a different storage device than the storage device upon which the corresponding data segment is stored.

138. (new) The method of claim 133 wherein a user enters a user selection through a host computer coupled to the mass storage system.

139. (new) A data storage system providing for differing level of data protection concurrently, comprising:

a mass storage system including a plurality of mass storage devices, each mass storage device having a microprocessor associated therewith;

a bus interconnecting said mass storage devices;

a central processing unit including a processor coupled to said mass storage devices and to program storage memory;

a user interface coupled to said central processing unit, said user interface configured to receive user input selections;

a data structure stored in said mass storage devices wherein the data structure includes:

a first logical unit including data blocks, the data blocks being distributed across the mass storage devices, wherein the first logical unit stores a body of data,

a second logical unit including mirror data blocks, the mirror data blocks being distributed across the mass storage devices, wherein each data block in the first logical unit has a corresponding mirror data block in the second logical unit and wherein no corresponding blocks in the first and second logical units are stored on the same mass storage device; and

a parity generation circuit that, in response to a user selection, generates parity information from the data blocks of the first logical unit and stores the parity information in the first logical unit.

140. (new) The data storage system of claim 139 wherein the parity information is generated concurrently with writing the body of data to the first logical unit.

141. (new) The data storage system of claim 139 wherein the parity information is generated subsequently to writing the body of data to the first logical unit.

142. (new) The data storage system of claim 139 wherein the parity information is also stored to the second logical unit.

143. (new) A mass storage system comprising:

a user interface for receiving user configuration selections;

a central processing unit connected to the user interface for acting upon the user configuration selections;

a plurality of mass storage devices;

a first logical unit spanning N mass storage devices, wherein N is an integer greater than one, and including at least one data block on each of the N mass storage devices;

a second logical unit spanning M mass storage devices, wherein M is an integer greater than one, and including at least one data block on each of the M mass storage devices;

wherein the central processing unit:

in response to a first user configuration selection stores a body of data in the first logical unit;

in response to a second user configuration selection generates and stores parity data for the body of data and stores the parity data in the first logical unit; and

in response to the third user configuration selection stores a mirror copy of the body of data in the second logical unit, the body of data being stored in said data blocks and the mirror copy being stored in corresponding data blocks, wherein for any given data block containing a segment of the body of data, the corresponding data block resides on a separate mass storage device.

144. (new) The mass storage system of claim 143 wherein N equals M.

145. (new) The mass storage system of claim 143 wherein the user interface is coupled to a host computer.

146. (new) The mass storage system of claim 143 further comprising a hot replacement mass storage device.

147. (new) A method of providing for user selectable levels of fault tolerance in a mass storage system comprising:

dividing a mass storage system into logical units;

receiving a user configuration selection indicating a fault tolerance scheme desired by a user to apply to first logical unit;

in response to a first user configuration selection storing a first copy of data to a first logical unit by striping the data across the plurality of mass storage devices and storing a mirror copy of the data to a second logical unit by striping the mirror copy of the data across the plurality of mass storage devices, wherein the stripes of the second logical unit are skewed with respect to the stripes of the first logical unit; and

in response to a second user configuration selection retrieving the data from the mass storage system, generating parity data from the data, and storing the data and parity data to the first logical unit.

148. (new) A method of storing data to a mass storage system with user selectable levels of protection comprising:

partitioning a plurality of mass storage devices into a two or more logical units, wherein each logical unit has a user selected level of information protection;

in response to a user selection designating a first logical unit as having a first level of protection, generating parity data for information to be stored to the first logical unit, logically partitioning the information and the parity data into a plurality of data blocks, and storing the data blocks on the plurality of mass storage devices; and

in response to a user selection designating the first logical unit as having a second level of protection, writing each data block to two locations on the mass storage devices, wherein the two locations are skewed with respect to one another such that each location resides on a different one of the mass storage devices.

149. (new) The method of claim 148 further comprising changing the level of protection for a logical unit after information has been stored to the logical unit.

150. (new) The method of claim 148 further comprising:

in response to a user selection designating a second logical unit as having a third level of protection, logically partitioning information to be stored to the second logical unit into a plurality of data blocks and storing the data blocks to the second logical unit on the plurality of mass storage devices; and

in response to a subsequent user selection designating the second logical unit as having a fourth level of protection, generating parity data for the information stored to the second logical unit, logically partitioning the information and the parity data into a plurality of data blocks, and storing the data blocks to at least one of said units on the plurality of mass storage devices.

151. (new) A method of providing user selectable levels of protection against data loss in a mass storage mechanism, comprising the steps of:

providing a plurality of disk drives for storing data therein, each disk drive being organized into storage segments;

organizing the storage segments of the plurality of disk drives into at least two functionally separate logical units;

receiving a first user input command which designates at least one of the logical units to be parity protected;

receiving a second user input command which designates the at least one of the logical units to be mirrored;

based on said first received user input command, generating parity data for data to be stored in the designated logical unit, and writing the data to be stored in the designated logical unit and the generated parity data to the plurality of disk drives;

based on said second received user input command, writing data blocks into said storage segments of said plurality of disk drives so that all data blocks written to a designated unit are mirrored by:

writing a first copy of a data block assigned to a first storage address in the designated logical unit into the first storage address in the designated logical unit, and

writing a second copy of the data block assigned in the first storage address in the designated logical unit into a second storage address in the disk drives,

wherein the second storage address is located in a disk drive separate from the disk drive containing the first storage address.

152. (new) A data storage apparatus comprising:

a plurality of mass storage devices, the mass storage devices divided into logical units;

a host interface receiving as input a user configuration selection indicating a fault tolerance scheme desired by a user to apply to first logical unit;

a storage platform receiving from the host interface an indication of the user configuration selection and in response thereto outputting instructions to the plurality of mass storage devices;

a first logical unit containing a first copy of data striped across the plurality of mass storage devices and a second logical unit containing a mirror copy of the data striped across the plurality of mass storage devices, wherein the stripes of the second logical unit are skewed with respect to the stripes of the first logical unit, when the first logical unit is configured with a first fault tolerance scheme; and

the first logical unit also containing parity data generated from the first copy of data when the first logical unit is configured with a second fault tolerance scheme.

153. (new) A recording medium having instructions recorded thereon executable by a computer for managing storage of data to a mass storage system with user selectable levels of fault tolerance, the mass storage system having a plurality of mass storage devices organized into logical units, said instructions including instructions for:

receiving a user designation of at least one of said logical units for selective operation thereupon;

in response to a designation of a logical unit for parity inhibition, writing data blocks of received information, which are targeted for said logical unit designated for parity inhibition, to storage segments of said mass storage devices within said logical unit designated for parity inhibition but not writing a parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for parity inhibition;

in response to a designation of a logical unit for parity protection, writing data blocks of received information, which are targeted for said logical unit designated for parity protection, to storage segments of said mass storage devices within said logical unit for parity protection and writing at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for parity protection; and

in response to a designation of a logical unit for off-line parity generation:

reading data blocks which have been written to storage segments of said logical unit designated for off-line parity generation without a corresponding parity block,

generating at least one parity block corresponding to said data blocks written without a corresponding parity block, and

writing the thus generated parity block to storage segments of said logical unit designated for off-line parity generation.

154. (new) A computer–readable medium having stored thereon instructions capable of causing a computer to perform a method comprising the steps of:

organizing storage segments of a plurality of mass storage devices into at least two logical units;

writing data blocks of received information, and parity blocks associated with said data blocks, to the storage segments of said mass storage devices;

in response to a user designation of at least one of said logical units for mirroring:

writing data blocks of received information which are targeted for said at least one of said logical units designated for mirroring, and at least one parity block corresponding to said data blocks, to storage segments of said mass storage devices within said at least one of said logical units designated for mirroring; and

writing a copy of said data blocks of received information targeted for said logical unit designated for mirroring to storage segments of said mass storage devices not within said at least one of said logical units designated for mirroring.

155. (new) A computer-readable medium having instructions recorded thereon executable by a computer, said instructions comprising instructions for:

organizing the storage capacity of a plurality of mass storage devices into at least two logical units, each logical unit including data segments on said mass storage devices;

receiving a user designation of a first logical unit as having parity inhibition and in response thereto to storing data blocks of received information in storage segments of the designated logical unit; writing data blocks of received information, which are targeted for said logical unit designated for parity inhibition, to storage segments of said mass storage devices within said logical unit designated for parity inhibition, but not writing a parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for parity inhibition;

receiving a user designation of said first or another logical unit as having parity protection and in response thereto to writing data blocks of received information, which are targeted for said first or another logical unit, to storage segments of said mass storage devices within said first or another logical unit and writing at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said first or another logical unit; and

receiving a user designation of said first or another logical unit as having off-line parity generation and in response thereto to:

reading data blocks which have been written to storage segments of said designated logical unit for off-line parity generation without a corresponding parity block,

generating at least one parity block corresponding to said data blocks written without a corresponding parity block, and

writing the thus generated parity block to storage segments of said mass storage devices.

156. (new) The computer-readable medium of claim 155 further comprising instructions recorded thereon for:

receiving a fourth user designation and in response thereto designating a logical unit for mirroring and writing data blocks of received information, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices within said logical unit designated for mirroring, and writing a copy of said data blocks, which are targeted for said logical unit designated for mirroring, to storage segments of said mass storage devices not within said logical unit designated for mirroring.

157. (new) The computer-readable medium of claim 155 further comprising instructions recorded thereon for:

receiving a fifth user designation and in response thereto, designating a logical unit for mirroring and parity protection and writing data blocks of received information, which are targeted for said logical unit designated for mirroring and parity protection, to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection and writing at least one parity block corresponding to said data blocks to storage segments of said mass storage devices within said logical unit designated for mirroring and parity protection, and writing a copy of said data blocks, which are targeted for said logical unit designated for mirroring and parity protection, to storage segments of said mass storage devices not within said logical unit designated for mirroring and parity protection.

158. (new) A recording medium having instructions recorded thereon executable by a computer, said instructions comprising instructions for causing the computer to:

configure a first logical unit, the first logical unit being distributed across a plurality of storage devices of an array of storage devices;

assign a first logical designation to the first logical unit;

configure a second logical unit, the second logical unit being distributed across the plurality of storage devices;

assign a second logical designation to the second logical unit;

receive a user selected first protection scheme for the first logical unit and apply data protection to data stored in the first logical unit in response to the user selected first protection scheme; and

receive a user selected second protection scheme to the second logical unit and apply data protection to data stored in the second logical unit in response to the user selected second protection scheme.

159. (new) The recording medium of claim 158 further comprising instructions for causing the computer to:

store in a third logical unit a mirror copy of data in the first logical unit when the user selected first protection scheme is mirroring.

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160. (new) The recording medium of claim 158 further comprising instructions for causing the computer to:

generate and store parity data for the data to be written to the second logical unit when the user selected second protection scheme is parity generation.

161. (new) A computer-readable medium having stored thereon instructions capable of causing a computer to perform a method comprising the steps of:

configuring a plurality of disk drives, each of the disk drives having storage space;

defining a first logical unit, the first logical unit including a first portion of the storage space of each of the disk drives;

writing data to the first logical unit using a first level of protection, wherein the data is striped across each of the disk drives of the storage system;

receiving a user selectable indication of a desired second level of protection;

reading the data from the first logical unit and generating therefrom parity data in response to receiving the user selectable indication; and

storing the parity data to the plurality of disk drives.

162. (new) The computer-readable medium of claim 161 wherein the instructions are capable of causing the computer to perform the further method steps of:

writing a mirror copy of the data to a second logical unit in response to receiving a user selectable indication of a desired third level of protection.

163. (new) A recording medium having instructions recorded thereon executable by a computer, said instructions comprising:

instructions for logically partitioning a plurality of mass storage devices into a two or more logical units, wherein each logical unit has a user selected level of information protection;

instructions for, in response to a user selection designating a first logical unit as having a first level of protection, generating parity data for information to be stored to the first logical unit, logically partitioning the information and the parity data into a plurality of data blocks, and storing the data blocks on the plurality of mass storage devices; and

instructions for, in response to a user selection designating the first logical unit as having a second level of protection, writing each data block to two locations on the mass storage devices, wherein the two locations are skewed with respect to one another such that each location resides on a different one of the mass storage devices.

164. (new) The recording medium of claim 163 wherein the instructions recorded thereon further comprise instructions for changing the level of protection for a logical unit after information has been stored to the logical unit.

165. (new) The recording medium of claim 163 wherein the instructions recorded thereon further comprise:

instructions for, in response to a user selection designating a second logical unit as having a third level of protection, logically partitioning information to be stored to the second logical unit into a plurality of data blocks and storing the data blocks to the second logical unit on the plurality of mass storage devices; and

instructions for, in response to a subsequent user selection designating the second logical unit as having a fourth level of protection, generating parity data for the

information stored to the second logical unit, logically partitioning the information and the parity data into a plurality of data blocks, and storing the data blocks to at least one of said units on the plurality of mass storage devices.